

Impact of smoking images in magazines on the smoking attitudes and intentions of youth: an experimental investigation

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Objective: To determine the effect of magazine incidental smoking imagery on youths' smoking intentions. **Methods:** A magazine was developed incorporating photographs of smokers (*Smoking Magazine*). A second version of the magazine (*Non-smoking Magazine*) included these photographs with the tobacco paraphernalia digitally erased. Equal numbers of smokers and non-smokers aged 14–17 years ($n=357$) were randomly assigned to look through one version of the magazine and then asked a series of questions. **Results:** Smokers made more unprompted mention of smoking imagery than non-smokers after viewing *Smoking Magazine* (52% vs 34%; $p<0.05$). Smokers viewing *Smoking Magazine* were more likely to report an urge to smoke (54% vs 40%; $p<0.05$). Female non-smokers who viewed *Smoking Magazine* were more likely than those who viewed *Non-smoking Magazine* to state a future intention to smoke (13% vs 0%; $p<0.05$). Female smokers were more attracted to the male models appearing in *Smoking Magazine* than *Non-smoking Magazine* (49% vs 24%; $p<0.05$) and the opposite was true for female non-smokers (28% vs 52%; $p<0.05$). Female smokers were also marginally more likely to desire looking like the female models in *Smoking Magazine* (64% vs 46%; $p=0.06$) but no difference was observed in the non-smoking females (46% vs 46%). Male smokers and non-smokers did not differ in their responses by magazine type. **Conclusions:** Incidental positive smoking imagery in magazines can generate the same sorts of consumer effects attributed to advertising in general, including tobacco advertising. Sex specific results of our study may be explained by the choice of smoking images used.

With a view to reducing tobacco related harm, a number of countries around the world have implemented comprehensive advertising and sponsorship bans of tobacco in accordance with the World Health Organization's Framework Convention on Tobacco Control (FCTC). Even with comprehensive tobacco control legislation, loopholes remain that can be exploited by the tobacco industry to circumvent comprehensive advertising restrictions. For example, product placements in movies and television programmes popular with adolescents are a noted tactic of the tobacco industry.¹ Furthermore, incidental depictions of tobacco in popular media, although not necessarily instigated by the tobacco industry, can serve to counter restrictions on advertising. Smoking depictions within youth oriented advertisements for non-tobacco products are common, being used as a device by advertisers to focus on the lifestyle and image of the user, rather than on the intrinsic value or merits of the product itself.² Incidental images of smoking are also common in editorial and feature components of youth oriented entertainment media, including movies, television, magazines and the internet. Although social determinants such as having parents, older siblings and peers who smoke are the best predictors of smoking initiation in youth,³ portrayals of smoking in popular media appear to contribute by presenting socially attractive images and inflating the perception of smoking prevalence.^{2 4 5}

Studies consistently suggest that incidental smoking is depicted far more commonly than is normal within the actual population, and that the majority of depictions are associated with popular and desirable role models with positive attributes such as fame, attractiveness, sexiness, sophistication and glamour.^{6–8} For instance an analysis of popular Hollywood movies in the late 1990s suggested that one in two heroes smoke, including 80% of leading male characters.⁸ In the early

1990s an audit of Australian youth oriented magazines suggested that photographs featuring smoking were "infrequent" (one depiction per 147 pages). An increase of 12% in smoking depictions was noted between 1990 and 1993 in the period after the introduction of the complete tobacco advertising ban but, as this increase was non-significant, natural variation could not be discounted.⁹ However, a similar audit of magazines conducted a decade later suggested that far from being infrequent, depictions of smoking were commonplace: 96% of a sample of youth oriented magazines included at least one depiction of incidental smoking (average 3.5 per magazine; one per 50.3 pages), with 97% of these depictions being favourable.¹⁰ Although the methodologies differed between the two studies, it appears that the tobacco advertising ban in Australia was followed by an increase rather than decrease in prevalence of smoking portrayals in magazines.

There is clear evidence that exposure to positive portrayals of smoking in movies and on television increases adolescents' positive attitudes towards smoking, the likelihood of smoking initiation, and imitation of modelled smoking actions.^{11 12} However, research investigating the impact of incidental portrayals of tobacco use in magazines is sparse. Amos and colleagues¹³ assessed adolescents' perceptions of photographs of models using tobacco products and compared these to adolescents' perceptions of identical photographs but with the tobacco paraphernalia digitally removed. They found that the presence of a cigarette affected how the model in a photograph was perceived: when tobacco products were present, models were associated with "drug taking," "wildness" and being "depressed," and to a lesser extent being "vain," "tarty" and "posers." Without the smoking paraphernalia the same models

Abbreviations: FCTC, Framework Convention on Tobacco Control

were perceived as being more “healthy,” “rich,” “nice,” “fashionable,” “slim” and “attractive.” Although traits such as “druggy,” “wild” and “tarty” may appear to be negative associations, smokers sampled in the study were found to be more drawn to such traits than non-smokers, and were found to rate themselves less negatively in terms of these traits than non-smokers. The authors concluded that although young smokers and non-smokers associated the same attributes to the smoking models, smokers identified more strongly with these attributes than did non-smokers, and hence the smoking imagery served to positively reinforce the self identity of young smokers. In a later complementary study,¹⁴ Amos and her colleagues conducted focus groups with young smokers and found that smoking imagery in magazines helped reinforce positive perceptions of smoking as attractive, sociable and reassuring thereby reinforcing young smokers’ own identities. Furthermore the lack of obvious vested interests in incidental smoking portrayals meant that such were potentially more powerful than tobacco advertising imagery.

The present study aims to extend the studies of Amos and colleagues by using a randomised controlled trial to assess the impact of smoking images in magazines on smoking and non-smoking youth, and particularly their intentions for future smoking. We hypothesised that positive smoking imagery in a youth oriented magazine would:

- lessen young smokers’ future intentions to quit;
- increase non-smokers’ future intentions to take up smoking;
- increase young people’s perceptions of the prevalence of smoking;
- increase young smokers’ urge to smoke while reading the magazine; and
- increase young smokers’ positive perceptions of the depicted models but decrease young non-smokers’ positive perceptions of the depicted models.

METHODOLOGY

Materials

To assess the impact of smoking images in a naturalistic setting, a 16-page mock-up of a youth lifestyle magazine was commissioned from a professional graphic designer. The full colour magazine consisted of a front cover and back cover and 14 pages of features and advertisements on contemporary fashion, music and movie reviews.

Eight photographs of popular musicians, actors and models smoking cigarettes were selected from various youth magazines. These images had been identified in a previous study of incidental smoking portrayals in the media as portraying the positive attributes sex, relaxation, power, and toughness.¹⁰ They were also selected for the ease with which they could be digitally altered. The photographs were distributed randomly throughout the sixteen pages of the magazine, resulting in approximately one smoking depiction per two-page spread. However we judged the magazine to be too overtly smoking oriented, so the final version of the magazine (*Smoking Magazine*) incorporated smoking on the back and front covers and three smoking depictions on separate two-page spreads within the magazine.

A second version of the magazine was created, identical but for the tobacco paraphernalia digitally erased from the five photographs (*Non-smoking Magazine*). In total there were 22 individuals (12 males and 10 females) depicted in 13 large size photographs (that is, full or half page photographs) and seven in smaller photographs. Most images depicted young models, famous musicians or film actors. Five of the large sized photos featured individuals smoking (three males and two females).

The five smoking depictions both with and without digital modifications can be viewed on the *Tobacco Control* website (<http://tobaccocontrol.bmj.com/supplemental>).

Overall design

The study design was a 2 (magazine conditions) × 2 (smoking status) between subjects experimental design with random assignment to magazine condition (subject to quota requirements).

Subjects

A power analysis ($\alpha = 0.05$ $\beta = 0.20$) to detect a meaningful difference between means along a five-point scale (± 1.0 SD = 2.5; one sided) determined that 90 participants per cell would be required. Thus the sample size was set at 360 participants for four cells (2 smoking status × 2 magazine type). A convenience sample was recruited via mall intercepts in the central business district of Perth, Western Australia. Youths were approached by the interviewers and asked if they would like to “comment on a new magazine for young people.” The interviewers were set quotas for equal numbers of smokers and non-smokers within the age range 14–17 years for each experimental condition. Quotas were also set for each cell for equal numbers of males and females and equal proportions within the age ranges 14–15 years and 16–17 years. So as not to prime participants about the nature of the study, screening items to determine participants’ eligibility were embedded in a series of distracter questions about how frequently they purchased magazines, attended the cinema, drank alcohol, smoked cigarettes and participated in sport, and what were their favourite magazines, radio stations and (if applicable) brand of alcohol and/or cigarettes.

In total, 1904 youths were approached between the hours of 10 am and 6 pm over a four-week period overlapping with spring school holidays in September 2004. Of those youths approached 529 declined to participate (27.8%), 414 fell outside the desired age range (21.7%) and 164 were unsuitable for other reasons, such as being non-Australian residents (that is, tourists) and/or non-proficiency in English (8.6%). Interviews did not continue after initial screening questions for a further 440 participants for whom age and/or smoking status quotas were already met (23.1%). Twenty-two per cent of all consenting youths met the criterion of a smoker, defined as having smoked at least one cigarette within the past two weeks. This resulted in the non-smoker quotas being met more rapidly than the smoker quotas.

The final sample composition is shown in table 1.

Procedure

Participants were randomly assigned to either the *Smoking Magazine* or *Non-smoking Magazine* condition. They were asked to read through the magazine, looking at each page carefully, so as to gain a “reasonably good idea” of the type of magazine it was. The magazine was then removed from sight and participants were interviewed using a structured questionnaire.

Questionnaire

The interviewer administered questionnaire was designed to measure the impact of the smoking images on relevant smoking variables, but at the same time, not appear to focus on smoking until the last few questions. Hence the interview began with five open ended questions about: (1) participants’ thoughts and feelings about the magazine; (2) what they liked the most; (3) what they liked the least; (4) what pictures they could recall; and (5) what was their impression of the people depicted in the photographs of the magazine.

Table 1 Sample age, sex and smoking status by experimental condition

		Smokers		Non-smokers		Total
		14–15 years	16–17 years	14–15 years	16–17 years	
<i>Smoking Magazine</i>	Males	22	22	23	22	89
	Females	23	22	25	21	91
	Total	45	44	48	43	180
<i>Non-smoking Magazine</i>	Males	22	21	22	22	87
	Females	23	23	22	22	90
	Total	45	44	44	44	177
Grand total		90	88	92	87	357

Participants were then presented with 10 bipolar attributes used to assess their assumptions about: (1) people who they thought would read the magazine; (2) “most males” appearing in the magazine; and (3) “most females” appearing in the magazine. The order of these 10 items was randomised for each participant so as to minimise ordering effects. The 10 attributes were adapted from the previous work of Amos *et al*¹³ that corresponded to those portrayed in the five smoking images. Participants’ impressions were measured on five-point rating scales for: very cool to very uncool; very sexy to very prudish; very unfashionable to very fashionable; very glamorous to very unglamorous; very fun-loving to very boring; very attractive to very unattractive; very rebellious to very conformist; very unpopular to very popular; and very tough to very weak (for example, “What did you think of most of the males in the pictures in the magazine? Would you say they were...‘cool’ or ‘uncool’? ...would you say ‘very’ cool or just ‘cool’?”). Female respondents were asked to what extent the male models were “how you like males to look” and how much the female models were “how you’d like to look.” Similarly, male respondents were asked to what extent the female models were “how you like females to look” and how much the male models were “how you’d like to look.” Participants then rated on a 10-point scale the extent to which, “while looking through the magazine,” they felt any urge to smoke a cigarette (1 = “no urge at all”; 10 = “very strong urge”). This was inserted between two distracter items that asked participants to rate their urge to buy the magazine and to go “partying.” Participants were then asked to rate to what extent the magazine would interest them personally, followed by further distracter questions on attitudes to getting a suntan and drinking alcohol. They were then asked a series of direct questions about smoking: what percentage of young adults they thought smoked; ratings of their general image of smoking on the 10 bipolar attributes noted above (for example, “do you think smoking is glamorous or unglamorous?”); non-smokers’ intentions to take up smoking “in the future”; and current smokers’ intentions “to quit smoking soon.”

RESULTS

Salience of smoking images in the *Smoking Magazine*

Responses to the first five open ended questions were analysed for any mentions of smoking to create a dichotomous smoking mentioned/not mentioned variable. Proportions of participants within each condition who mentioned smoking were then compared using χ^2 analyses. As expected, none of those who viewed the *Non-smoking Magazine* made reference to smoking or cigarettes. However, nearly half (42%) of those viewing the *Smoking Magazine* made unprompted mention of the smoking imagery at least once in their responses to the five open ended questions, with a significantly greater proportion of smokers compared to non-smokers making such mentions (52% vs 34%;

$\chi^2 = 5.019$; $p < 0.05$). This result was consistent between the sexes. Of the five questions, smoking was most frequently mentioned in recall of the pictures in the magazine (43% of smokers vs 28% of non-smokers; $\chi^2 = 4.584$; $p < 0.05$). A small proportion of smokers mentioned smoking images when asked what they liked most about the magazine (5%) but no non-smokers made such comments ($\chi^2 = 4.183$; $p < 0.05$).

H1: Smoking imagery lessens smokers’ intentions to quit

The proportions of smokers viewing each version of the magazine who stated they “want to quit soon” were compared using a χ^2 analysis. A lesser proportion of smokers who viewed the *Smoking Magazine* indicated that they “want to quit soon” (43%) compared to smokers who viewed the *Non-smoking Magazine* (54%). This result was in the hypothesised direction, but the 9% difference failed to achieve statistical significance ($\chi^2 = 2.250$; one tailed $p = 0.09$). There were no sex differences observed.

H2: Smoking imagery increases non-smokers’ intentions to smoke

Very few non-smokers stated there was any possibility of them smoking in the future. As such the proportions of non-smokers stating they “definitely,” “probably” or “might” take up smoking in the future were combined and then contrasted to proportions stating they “definitely won’t take up smoking.” Three times more non-smokers who viewed the *Smoking Magazine* indicated some possibility that they would take up smoking in the future (9%) compared to non-smokers who viewed the *Non-smoking Magazine* (3%). This result was in the hypothesised direction but a χ^2 analysis suggests it was not statistically significant ($\chi^2 = 2.304$; one tailed $p = 0.113$). No significant difference was observed between male non-smokers who viewed the *Smoking Magazine* versus the *Non-smoking Magazine* (7% vs 4%; $\chi^2 = 0.236$; one tailed $p = 0.489$). However the proportion of female non-smokers who indicated some possibility of taking up smoking in the future was significantly greater among those who viewed the *Smoking Magazine* versus the *Non-smoking Magazine* (13% vs 0%; $\chi^2 = 6.291$; one tailed $p < 0.05$).

H3: Smoking imagery increases perceptions of the prevalence of smoking

Participants’ mean estimates of the proportion of Australian adults who smoke were compared using a 2×2 ANOVA. Smokers made a significantly—but not substantially—higher mean estimate than non-smokers of the proportion of adults who smoke: 54% vs 46% ($F(1) = 15.470$; $p < 0.001$). There was no significant main effect by magazine version, with mean estimates between participants who viewed the *Smoking Magazine* (50%) being the same as those who viewed the *Non-smoking Magazine* (50%) ($F(1) = 0.066$; $p = 0.797$). Nor was

there a significant two way interaction. No sex differences were observed.

H4: Smoking imagery increases smokers' urge to smoke

The proportion of participants who stated any urge to smoke at all along the 10-point scale were compared to those claiming "no urge at all." Among smokers 54% who viewed the *Smoking Magazine* reported at least some urge to smoke compared to 40% of smokers who viewed the *Non-smoking Magazine* ($\chi^2 = 3.246$; one tailed $p < 0.05$). This hypothesis was therefore supported. Of non-smokers the proportion who reported at least some urge to smoke was greater amongst those who viewed the *Smoking Magazine* (10%) compared to those who viewed the *Non-smoking Magazine* (7%) but this difference was not statistically significant ($\chi^2 = 0.550$; one tailed $p = 0.320$).

H5: Smoking imagery reinforces pre-existing notions of smoking

MANOVAs were undertaken of the 10 bipolar attributes regarding participants' perceptions of the readers, and the male and female models appearing in the magazines. These yielded 90 comparisons by magazine type, smoking status and the interaction of these two factors. There were no significant main effects observed by magazine type or smoking status, nor interactions between these two factors.

The four items that were sex specific (for example, for males "the females in the magazine were how I like females to look") were analysed using χ^2 analyses. Although smoking and non-smoking males showed no significant pattern of differences, female smokers who viewed the *Smoking Magazine* were significantly more likely than female smokers who viewed the *Non-smoking Magazine* to state that the males appearing in the magazine were "how I like males to look" (49% vs 24%; $\chi^2 = 6.139$; $p < 0.05$). Conversely, female non-smokers who viewed the *Smoking Magazine* were significantly less likely than female non-smokers who viewed the *Non-smoking Magazine* to suggest that the males appearing in the magazine were "how I like males to look" (28% vs 52%; $\chi^2 = 5.403$; $p < 0.05$).

With respect to self desirable perceptions, a greater proportion of female smokers who viewed the *Smoking Magazine* also stated that the females appearing in the magazine were "how I would like to look" compared to female smokers who viewed the *Non-smoking Magazine* (64% vs 46%). This difference approached statistical significance ($\chi^2 = 3.245$; one tailed $p = 0.06$). In comparison, female non-smokers were no more or less likely to state that the female models were "how I would like to look" regardless of magazine type (48% vs 48%).

General perceptions of smoking

Participants' ratings of their general perceptions of smoking were also analysed using a 2×2 MANOVA comparing magazine type and smoking status. A significant main effect was found by smoking status for all attributes, except rebellious ($p = 0.760$), with smokers being consistently more likely than non-smokers to associate the image of smoking with cool ($p < 0.001$), sexy ($p < 0.001$), fashionable ($p < 0.001$), glamorous ($p < 0.001$), fun loving ($p < 0.001$), attractive ($p < 0.001$), popular ($p < 0.001$), tough ($p < 0.001$) and leadership ($p < 0.001$). No main effects of magazine type were observed. However one interaction was observed, with significantly more smokers viewing the *Smoking Magazine* rating the general image of smoking as "very sexy" or "sexy" (24.7%) compared to smokers who viewed the *Non-smoking Magazine* (14.6%) or non-smokers who viewed each magazine type respectively (4.4% and 3.4%) ($F = 7.342$ $p < 0.01$). No meaningful sex differences were observed.

DISCUSSION

The incidental smoking imagery in the *Smoking Magazine* was certainly noticed by participants: a majority of smokers and substantial proportion of non-smokers made unprompted mention of such suggesting our experimental methodology was appropriate to study the impact of incidental smoking imagery in magazines.

Most of our hypotheses were supported or partially supported but a number of unanticipated sex differences were observed. The hypothesis that incidental smoking imagery increases smokers' immediate urge to smoke (H4) was supported for both sexes. The hypothesis that incidental smoking imagery increases non-smokers' intentions to smoke in the future (H2) was supported for females but not for males. So to the hypothesis that smoking imagery reinforces pre-existing conceptions about smoking (H5) was supported for females but not males. Results for the hypothesis that smoking imagery decreases smokers' future intentions to quit (H1) was in the predicted direction, but only approached statistical significance ($p < 0.10$). Our results also suggested that female non-smokers were more likely to consider smoking in the future when exposed to incidental smoking imagery.

The hypothesis for which we found nil supporting evidence was that incidental smoking imagery increases the perceived prevalence of smoking (H3). Smokers gave significantly higher estimations than non-smokers, possibly because they have more parents, older siblings and/or peers who smoke.³ This suggests that participants chiefly used personal experiences for their prevalence estimations. However it is very interesting to note that our sample's average estimate of smoking prevalence (50%) is far closer to that of lead roles in popular movies (56%) than actual prevalence within Australia (17%).⁸

Replicating the Amos *et al's* 1998 findings, smokers and non-smokers viewed smoking models similarly in the present study, but smokers viewed the general image of smoking more positively than non-smokers. Also similar to Amos and colleagues, we found that female smokers were attracted to male models who smoked, while female non-smokers were repelled. There was also marginal evidence to suggest that smoking imagery tends to reinforce young smoking women's self image aspirations.

Females were more likely than males to be affected by the incidental smoking imagery on many measures in our study. This may be some cause for concern as magazine buyers in Australia are predominantly female (69% of females vs 31% of males purchase magazines).¹⁵ However the reason why females were more vulnerable in our study is not clear. The previous study from which the two images of smoking female models was sourced rated each image very high on sexiness, while those for the male images promoted power, toughness and relaxation. The single interaction we observed between magazine type and smoking status may therefore be telling in that smokers who viewed the *Smoking Magazine* were more likely to adjudge the general image of smoking as more sexy than those who viewed the *Non-smoking Magazine*. It is therefore possible that the specific images used in our study may account for the sex differences observed and our sex specific findings may not extend beyond our experiment.

A limitation of our study was that we did not account for sex differences in our initial sample size calculations. As such our experiment was underpowered to examine sex specific differences between smoking and non-smoking participants who viewed each magazine type, emphasised by the fact that several of our results approached statistical significance, but did not satisfy the minimum Fisherian criteria to support our hypotheses. Should any future replication of this experiment be attempted, based upon the observed differences from

What this paper adds

- Exposure to positive portrayals of smoking in movies and television has been demonstrated to increase adolescents' positive attitudes towards smoking and likelihood of initiation.
- Previous investigations of the effect of positive portrayals of smoking in magazines has found that such imagery reinforces positive perceptions of smoking but there has been no measure of the impact of such on future intentions to smoke in an experimental setting.
- The present study contributes to knowledge in this field by confirming that adolescent smokers are more attuned to smoking imagery, and that such imagery stimulates an immediate urge to smoke and lessens intentions to quit.

our results, we recommended to use at least 200 subjects per cell.

Although not all our hypotheses were supported, the cumulative pattern in the data suggests that incidental positive smoking imagery in magazines *can* have a counter effect to anti-tobacco campaigns by generating the same sorts of consumer effects attributed to advertising in general, including tobacco advertising. Before our study, there were data to suggest that incidental smoking imagery influenced smokers' perceptions of smoking and self image, but few data on the influence of smoking images in magazine on young people's smoking intentions. The present study has contributed to knowledge in this field by confirming that adolescent smokers are more attuned to smoking imagery, and that such imagery influences future intentions to smoke. Given the cumulative ecological effect of such visual imagery in the entertainment media, it is quite likely that such images in magazines contribute to an increase in young smokers' consumption and prolong their smoking.

These results support the continuing call for regulation of incidental smoking imagery in popular visual media such as movies and television, but now also magazines and all other types of visual media, including billboards and posters. Certainly tobacco companies should be strongly opposed to commissioning incidental portrayals of smoking imagery in materials appearing in visual media, as they have been noted to do so in the past. Efforts to curb intentional or unintentional smoking portrayals in popular media that have until now concentrated on movie and television producers should now be extended to advertisers and magazine editors, to make them aware of the harmful effects of incidental portrayal of smoking imagery. Monitoring of incidental smoking imagery portrayals

should also continue in magazines, to ascertain whether greater regulation is warranted.

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Five smoking depictions both with and without digital modifications can be viewed on the *Tobacco Control* website (<http://tobaccocontrol.bmj.com/supplemental>).

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